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CLAIMS

[Claim(s)]
1. In Order that an Error Location Hand in a Multi-WORD Group's WORD May Offer a Loan While offering WORD type interleaving and WORD type error protection-code facility It is the method of encoding multi-WORD information based on a multi-bit symbol which touches relatively about data medium. How to encode multi-WORD information characterized by borrowing a high pro theque tee BITI hand which is turned to low PUROTEKUTIBI tee target WORD, and a hand in WORD producing a loan.
2. It is the method according to claim 1 which are scattered in the first homogeneity format about target WORD which this hand borrows, and WORD has the first homogeneity size, has the second homogeneity size, and is scattered in the second homogeneity format.
3. Method according to claim 1 accepted by storing of optical data medium.
4. It is a method according to claim 1 of said information being offered as a block, and said each block having two or more sectors, including said code facility and additional error protection of those other than said code facility, and sequential aforementioned data medium being provided with these two or more sectors, and having self header information, respectively.
5. Method according to claim 4 of providing said each sector with provisional pro theque tee BITI as low rhe TENSHI error amendment device.
6. For said symbol, said provisional pro theque tee BITI is a method according to claim 5 of having other different symbol alphabet.
7. Said provisional pro theque tee BITI is the method according to claim 5 of being a subspace sub-code.

8. Said provisional pro theque tee BITI is the method according to claim 5 of being burst error amendment.
9. While an Error Location Hand in a Multi-WORD Group's WORD Evaluates a Loan and Attains a Decryption of WORD Type Day Interleaving and Error Protection-Code Facility In a method of decrypting received multi-WORD information based on a multi-bit symbol offered in a place which touches relatively about data medium How to decrypt receiving multi-WORD information characterized by for a high pro theque tee BITI hand which is turned to low PUROTEKUTIBI tee target WORD borrowing, and a hand from WORD acquiring a loan.
10. A method according to claim 9 based on target WORD which a hand which has the first homogeneity size and are scattered in the first homogeneity format borrows, and has WORD and the second homogeneity size, and is scattered in the second homogeneity format.
11. A way according to claim 9 a continuous hand in a series of information that borrowed a hand, and each hand offered a loan and an amended symbol in WORD was received makes an elimination flag collectively to a middle symbol and/or one or more external contiguity symbols physically [a loan / target WORD].
12. A way according to claim 11 a middle eternal hand in this series borrows, and a notional hand assigns a loan to a WORD symbol.

13. It is a method according to claim 9 of said information being acquired from said data medium as a series of blocks, and said each block having two or more sectors, including additional error protection of those other than said code facility and said code facility, and these two or more sectors being continuously obtained from said data medium, and having self header information, respectively.
14. A method according to claim 13 of performing error protection to coincidence per sector in synchronization information which has further redundancy besides said code facility.
15. A way according to claim 13 provisional pro theque tee BITI as a low rhe TENSHI error amendment device estimates a sector in first stage while returning chiefly at this WORD type decryption in the case of said provisional pro theque tee BITI error.
16. A method according to claim 15 of accessing said provisional pro theque tee BITI at the code alphabet from which it differs other than said code facility in coincidence.
17. Said provisional pro theque tee BITI is a method according to claim 15 of having a subspace sub-code.
18. Said provisional pro theque tee BITI is a method according to claim 15 of permitting multi-bit burst error amendment.
19. An Interleave Means to Offer WORD Interleaving in a Block A coding means to offer WORD type error protection-code facility An allocation means by which an error location hand in a multi-WORD group's WORD offers a loan It is coding equipment equipped with the above, and said allocation means is characterized by being arranged in order that this hand that a high pro theque tee BITI hand borrows, and produces WORD, and is turned to low PUROTEKUTIBI tee target WORD may offer a loan.
20. Said interleave means is equipment according to claim 19 arranged in order for said hand of having the first homogeneity size which is scattered in the first homogeneity format to borrow about target WORD which has the second homogeneity size and is scattered in the second homogeneity format and to interleave WORD.
21. It is equipment according to claim 19 which said information is offered as a block and said each block has two or more sectors, including additional error protection of those other than said code facility and said code facility, and said data medium is continuously provided with said two or more sectors, and has self header information, respectively.
22. Equipment according to claim 21 which provides synchronization information out of said code facility with additional error protection of each of said sector.
23. Equipment according to claim 19 which has further a distribution means to distribute said each block to a physical sector, and to provide said each sector with provisional pro theque tee BITI as a low rhe TENSHI error amendment device.
24. Said provisional pro theque tee BITI is equipment according to claim 23 out of said protection-code facility.
25. For said symbol, said provisional pro theque tee BITI is a method according to claim 23 of having the different code alphabet.
26. Said provisional pro theque tee BITI is the method according to claim 23 of being a subspace sub-code.
27. Said provisional pro theque tee BITI is the method according to claim 23 of being burst error amendment.
In the equipment which compound-izes the multi-WORD information based on a multi-bit symbol offered in a place which is equipped with the following and adjoins relatively about data medium information was received Said evaluation means is equipment which is characterized by to be arranged in order that a high pro theque tee BITI hand turned to low PUROTEKUTIBI tee target WORD may borrow and this hand may pull out a loan from WORD and which compound-izes. 28. A Day Interleave Means for Performing WORD Type Day Interleaving in a Stored Information Block A means to decrypt error protection-code facility An evaluation means by which an error location hand in a multi-WORD group's WORD evaluates a loan
29. Equipment according to claim 28 based on target WORD which a hand which has the first homogeneity size and are scattered in the first homogeneity format borrows, and has WORD and the

second homogeneity size, and is scattered in the second homogeneity format.
30. Equipment according to claim 28 arranged in order to receive a multiple consecutive sector from a stored block, and in order to perform error protection for every sector through a header and/or synchronization information redundancy out of said code facility.
31. Equipment according to claim 28 which returns to said WORD type decryption means only when it has further an assessment means to assess each physical sector from said block, and to evaluate each sector first about provisional pro theque tee BITI as a low rhe TENSHI error amendment device and said assessment means goes wrong.
32. Starting provisional pro theque tee BITI evaluation is equipment according to claim 31 related to a single physical sector.
33. Said assessment means is equipment according to claim 31 by which provisional pro theque tee BITI is evaluated the first half besides said code facility.
34. For said symbol, said assessment means is equipment according to claim 31 which assesses the different code alphabet.
35. Said provisional pro theque tee BITI is equipment according to claim 31 which is a subspace sub-code.
36. It is the physical support which both WORD and target WORD contained error protection-code facility, an interleaved hand borrowed, it has an array of WORD and target WORD and said hand borrowed, an error hand in a multi-WORD group's WORD borrowed said error protection-code facility, it offered information, and said hand borrowed, and was made when a method according to claim 1 of having error pro theque TIBITI higher than said target WORD is used for WORD.
37. It is the support according to claim 36 which this hand borrows, and WORD has the first homogeneity size about target WORD, and it is scattered in the first homogeneity format, and said target WORD has the second homogeneity size, and is scattered in the second homogeneity format.
38. Support according to claim 36 used with substrate incidence read-out based on optical storing.
39. It is the support according to claim 36 to which said array is formed in inside of an information block containing a physical sector which was made two or more continuation, and which can be offered, and said sector has error pro theque TIBITI besides said code facility, including header information respectively.
40. Said each sector is support according to claim 39 which has provisional pro theque tee BITI made into a low rhe TENSHI error amendment device.
41. Said provisional pro theque tee BITI is support given in the different alphabet from said symbol at ******** claim 40.
42. Said provisional pro theque tee BITI is support according to claim 40 which is a subspace sub-code.
43. Said provisional pro theque tee BITI is support according to claim 40 which is burst error amendment.

[Translation done.]

Drawing selection Representative drawing

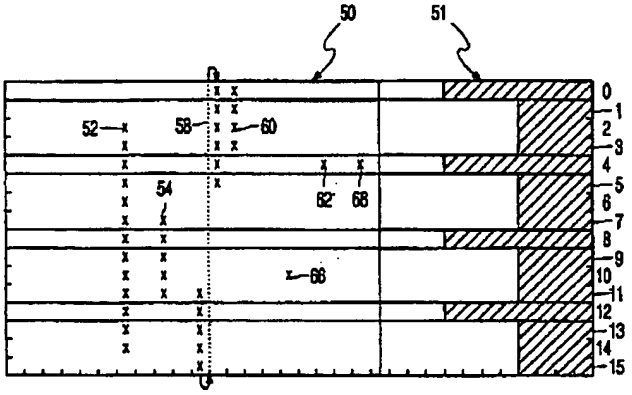

FIG. 2

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
Background of control invention of the quantum state probability distribution in a correlation This invention relates to the transmitting method of a quantum non-localization modulating signal.
It is possible to guide so that light may be emitted in the pair of a photon which has the polarization which some of atoms and nonlinear descent conversion crystals (downconversion crystal) of a class have in a correlation under a fixed condition by Aspect etc., and the linearly polarized light in the correlation of the pair of a photon always has 90 relation mutually with the property of the light source, or it was proved that it was always mutually parallel. The probability of a photon to be able to supply the flow which was far apart, and for any one of each of the pair to be in each flow, or for each photon to be found out in which flow can be equal. Furthermore, under certain conditions, this photon emitted light, without having any predetermined directions of the linearly polarized light, and what it opts for because the polarization condition of a photon only measures polarization of one of photons was proved strongly.
Therefore, though two photons separate distantly [how] and are moving in advance of measurement when the case of polarization correlation of a right angle was assumed, and one photon was polarizing perpendicularly and it is measured, the photon of another side will polarize at a level with the moment. Although the polarization condition of two photons becomes entangled 100% and measurement of one polarization condition determines the polarization condition of another side, in advance of measurement, the polarization condition of both this is indefinite. The photons of both this are some same bodies, and however it may separate and move in the distance mutually, changing the property of one photon essentially changes the property of all bodies in an instant including the property of the photon of another side. The experiment of Aspect others made most quantum theoretical physicists sure of it not being beforehand determined at the time of luminescence that polarization of the photon in this correlation is non-localization-like, i.e., polarization, but a specific condition condensing rather at the moment of one "observation" of this photon. A. Aspect.J.Grangier, G.Roger, and Phys.Lett. -- 47,460 (1981), 49, and 91 (1982). A. Aspect, J.Dalibard and G.Roger, Phys.Lett.49, 1804(1982);Z.Y.Ou and L.Mandel, Phys.Lett.61, 50 (1988) and 61, 54 (1988).
Many quantum theoretical physicists and experimental physicists tackled the problem of whether to be able to use the non-localization effect of the particle in a correlation as a base for transmitting information.
It is claimed that it is impossible for the conclusion Aspect others were announced officially, saying. The semantics of Baggott, Jim, and quantum theory, Oxford Science Publications, the Oxford university publication section, 1992, 148 - 150 pages; Eberhardt, R.Ross, Found.Phys.Lett., 2,127 (1989). I hear that the rate of passing which flow via each polarizer in any of the photon in a correlation the logic being is always visible to random (random), and there is. It is the correlation of the polarization between two photons that is not random. Since a receiving set cannot know the condition of the photon which a sending set sends out, it cannot collect information from the received photon. Therefore, a signal and a noise are equal magnitude.

Conclusions, such as this, are the right as long as it is valid as it is. In the system analyzed before, the light source of the photon in a correlation is placed in the middle of a sending set and a receiving set, one polarizer is assumed to be one by each end point section of two flows of a photon to a receiving set to the polarizer of - **, i.e., a sending set, and agreement of the photon detection in a sending set and a receiving set is observed as a function of a polarizer angle. As for information being transmitted by the correlation of photon polarization using this equipment designed especially for the agreement count, it is obvious that an impossible thing is true.

Since the researchers of the past in this field cannot do transmission of the information by the correlation of the polarization which used two polarizers, two pieces, or the detection equipment beyond it, even if they add a polarizer to a system further, they are considered to have surmised that it did not become an improvement of a problem. Once a photon passes a linearly polarized light child, it is also clear that it was generally assumed that the polarization condition was fixed.

this invention person discovered that the additional polarizer which was arranged correctly and controlled separated an information signal from a noise in the photon system in a correlation, and enabled it to use this system for informational transmission. This purpose is attained without needing implementation of measurement of a correlation. Unlike the correspondence procedure using the quantum particle in the conventional correlation, this invention does not need to transmit the both sides of the photon pair in a correlation to a receiving set, in order to carry out an agreement count. Probably, a correlation actually seems to be random, when, as for measurement **** of a polarization correlation, measurement of an agreement count is carried out. Therefore, if it says further, the condition of a photon and the condition of the equipment instead of a quantum body and a correlation will be transmitted. It is considered that equipment is what consists of the flow of the photon in the correlation which connects these two with the system in a transmitting end and the system in a receiving end further. Since change of the equipment in a transmitting end is connected with the single quantum body which is a single quantum body and is located in the both ends of both locations, it influences the observation in a receiving end immediately.

Epitome of invention Therefore, the purpose of this invention is offering a means transmitting information by control of the non-localization correlation effect in the quantum body of the pair in a correlation.

Another purpose of this invention is offering the means for linking two measuring devices isolated physically according to the non-localization effect of a quantum.

Another purpose of this invention is offering a means establishing the reference point of the coincidence to two measuring devices isolated physically.

Another further purpose of this invention is offering the means for controlling the probability distribution of the quantum body turned to the receiving set by controlling the probability distribution of the quantum body which transmitted information and was turned to the sending set by transmission to the receiving set of one quantum body of the quantum bodies of a pair, and transmission to the sending set of the quantum body of another side.

This invention is based on the effect of two quantum physics, namely, is an interaction with the non-localization correlation of the quantum state of the quantum body of a pair, and the spin selecting arrangement by which continuation arrangement was carried out with each quantum.

Quantum mechanics is a set with the mathematical operator which can be used for predicting statistical behavior of many quantum bodies containing Bose particles, a fermion, an atom, the photon that is especially the quantum unit of light to be a regulation. Quantum mechanics does not explain why regulations', such as this, being realized why or this regulation exists primarily. The philosophy used as the semantics of this regulation and the keynote is left to the large interpretation. The interpretation of the quantum mechanics accepted most widely is called a Copenhargen interpretation. I hear that it is not fixed till the moment of observation of this body, or detection, and one of the principles of a Copenhargen interpretation has the specific attribute of a quantum body. Science, 270 volumes, December 1, 1995, a page 1439-1440. Aspect and other researchers are supporting this strongly with it being a fact especially to a photon. Three papers of above Aspect, Ou and Mandell, Baggott.

When a quantum theory-particle interacts mutually for this principle, the attribute of the particle which that quantum state became entangled and was measured succeedingly is linked, or comes to have a correlation. Since the original interaction is accompanied by conservation of energy, momentum, a quantum numbers, or other attributes, the condition of two particles should fill the right conservation law, when this condition is finally measured. Furthermore, when the attribute of each particle is not fixed till the moment of measurement, the only method for filling a conservation law is that measurement action of the one attribute of a particle goes the particle in this and a correlation as ****** which agrees with a conservation law momentarily. A Copenhargen interpretation proposes making the quantum state currently asked contract the potential quantum state (Schroedinger wave function) which the quantum body which has measurement action of one quantum body in the correlation of another side piled up.

or the linearly polarized light polarizes in parallel mutually according to the method of the generation for the conservation law of the angular momentum which should be filled in the case of the photon in a correlation -- a certain ** -- it polarizes at a right angle mutually -- **** (they are Type I and Type II, respectively) -- it carried out and is entangled 100%. It seems that this shows two edges of the rod of the perfect rigid body with which a photon continues being extended. When a photon interacts with a linearly polarized light child and one edge is twisted in a specific location, an other end will twist this photon immediately.

The second effect currently used in this invention is related with the specific property of the interaction of a quantum body and a spin selecting arrangement. For example, the interaction of light and a polarizer is usually explained by electromagnetic wave theory, and a polarizer absorbs alternatively the vector component of electric field perpendicular to a polarization shaft (or reflection). Although satisfaction goes when this judgment deals with a huge number of photons, each photon shows a very different view.

The energy of a photon is connected with the color of a direct photon. or [being absorbed 50% by about 50% of light passing according to the type of a polarizer, if the light polarized at random bumps into a linearly polarized light child] -- or it is reflected. (Since it is easy, the following explanation is limited to an absorption polarizer.) If each photon throws away the one half of the energy by losing an electric-field component perpendicular to a polarization shaft, the color of this photon will change dramatically. However, when this experiment was conducted, change of any colors was not accepted.

Therefore, not each photon interacts with a polarizer by this method. Although one polarization direction makes a photon absorb with a polarizer, other polarization directions pass this polarizer for this photon. Although the one half of a photon chooses one direction, since the remaining one half chooses other directions, the result of net is in sight like electromagnetic-field theory.

If the 2nd polarizer or spin selecting arrangement is put on the path of light after light passes the 1st polarizer, the percent of the light which passes this 2nd polarizer of it being dependent on the angle of this polarization shaft over this 1st polarizer is well-known. If the polarization shaft is parallel, almost all the light that passes the 1st polarizer will pass the 2nd polarizer again. the light in which it crosses, or a polarization shaft passes the 1st polarizer of each other right angle, i.e., when it is 90 degrees mutually, -- mostly, all are blocked with the 2nd polarizer or are absorbed. The passing light of a small amount is called leakage (leakage), and this is the scale of the effectiveness of a polarizer. The efficient leakage level of a polarizer is very low when it ****** mutually, and it is 1% of about 1/10 (a Glan-Thompson polarizing prism, Newport part number 10GT04AR14). Probably it is impossible to offer the polarizer perfect effectiveness because of the tunnel effect of a photon.

The important feature is the polarization shaft which carried out the right angle about the pair of the crossing polarizer. In order to simplify explanation, the 1st polarizer has a level polarization shaft, the 2nd polarizer has the perpendicular polarization shaft, and a polarizer assumes that it is a completely efficient thing. We assume that the polarization condition of a photon is indefinite, before encountering the 1st polarizer. (Although the photon in the correlation made to emit light with a fixed nonlinear parametric descent conversion crystal has the "potential" polarization condition, it can obtain the polarization interrelation between two photons by carrying out actuation in a photon.)

Shortly after encountering the 1st polarizer, the photon should choose any of perpendicular polarization or perpendicular polarization they are. A photon is in choosing horizontal or vertical any they are etc. by carrying out, and has probability. A photon will be absorbed if perpendicular polarization is chosen. That is, this polarization is observed in this case. If this photon chooses level polarization, this photon will be passed with a polarizer. Since it is not observed yet and this energy is not handed over by the electron yet, it is important for the photon which passes a polarizer that this polarization condition cares about that it is still easy to change. If this invention person has "potential" polarization, he will call the photon in this condition. This does not mean that this photon can take polarization of what kind of arbitration without the effect of external, but it means rather that the effect of external can change the observed last polarization.

The photon of not passing a perpendicular polarizer succeedingly which passed the level polarizer and by which disturbance is not carried out is well-known. This photon is absorbed when the photon which polarized horizontally potentially encounters the 2nd perpendicular polarizer. The probability which chooses perpendicular polarization is zero in practice to the photon which passes a level polarizer first. Here, the 3rd polarizer is introduced into an experiment. The 1st polarizer which encountered the photon is usually called a polarizer, and the 2nd polarizer is called an analyzer. The 3rd polarizer is placed between a polarizer and an analyzer and this polarizer is called the gate. In the experiment which has the polarizer of these three individuals, the gate will assume the polarization shaft to be turned to a polarizer and parallel. It is in ** that the photon with which a photon did not influence to passing an analyzer, but this direction of this gate passed the polarizer passes also through the gate, and is stopped with an analyzer. Probably, it does not have effect for a photon to pass an analyzer, either, when the direction of the gate is parallel to an analyzer. At this time, the photon which the gate carries out work like an analyzer and passes a polarizer is stopped by this gate, and does not reach an analyzer by any means.

If the gate is turned to the angle which is parallel to neither of other polarizers, a strange thing will happen. It is convenient to choose the angle of the gate so that it may become **45 degrees from the both sides of an analyzer and a polarizer. The photon which passes a polarizer has "potential" level polarization (since the photon is not yet observed so that this polarization may be given, it is potential). The photon [** / "it polarized horizontally"] has the possibility of 50/50 which passes through the gate or is absorbed by this gate. When this photon encounters the gate, this photon should choose new polarization [which / perpendicular to this shaft / whether to be parallel to the polarization shaft of the gate, and], and must be in any of whether it is passed or to be absorbed.

If a photon passes through the gate, this photon has -45 "potential polarization" instead of having the zero probability to pass an analyzer there, and this passage has 50% of possibility. If an analyzer is encountered, a photon will choose immediately any of whether it is absorbed as a photon which polarized horizontally, or to be passed as a photon which polarized perpendicularly they are. Thus, it is made for the photon the beginning "polarized horizontally" to turn into a photon which polarized perpendicularly by imposing middle quantum decision on this photon.

the probability or the rate of a photon of passing all the three polarization elements since the percentage of a photon of passing each of a polarization element is 50% -- =(0.5X0.5X0.5) 0.125 -- in other words, it is 12.5%. Photons, such as this, are photons which made an all "right" decision in each polarizer. The 87.5 remaining% makes the "mistaken" decision and is absorbed in which place of a path.

If it summarizes, a certain process can make the quantum body of the pair which is in a correlation like the photon put on linear polarization, and it is well-known that measurement of polarization of one photon sets the polarization condition of one photon as the value which is not contradictory to this. It is also well-known that the linearly polarized light of a photon can be changed without detection to it by making a series of quantum selections in case a series of analyzers are passed to a photon.

Technology, such as this, is taken into consideration. The aforementioned purpose of this invention The method and equipment for controlling the probability distribution of the condition of the quantum of one quantum body of the quantum body in the correlation of a pair are offered. It has the step which offers the quantum body which has this method in the correlation of a pair. Each of this body has the quantum state probability distribution of homogeneity, and uses the control means for choosing the probability

distribution of the quantum state which can observe the quantum body of another side of the quantum body in the correlation of a pair. This means for controlling the probability distribution of the quantum state of one quantum body is offered. In order to choose the probability distribution of the quantum state of the quantum particle of another side, this control means is used. The quantum state probability distribution for which it chose as and one [this] quantum body was prepared succeedingly whether the quantum state of the quantum body of another side is observed by observation of the quantum state of the quantum body of another side In order to determine whether it was changed or not, it is attained by observing the quantum state of one quantum body of the quantum body in the correlation of a pair. The quantum state probability distribution of the quantum body of another side of the quantum body which is in the correlation of a pair alternatively is controlled by this method, it is alternatively observed succeedingly by this control, and information can be made to transmit alternatively immediately after observation of the quantum state of one quantum body by choosing whether to give modification of the condition of the quantum of a quantum body.

Especially the method of this invention is applicable to the various quantum bodies which contain a photon again with Bose particles, a fermion, and an atom. The quantum body in the correlation of a pair can be made to offer as a part of flow of the quantum body in a correlation. Although not necessarily limited to this, include spontaneous emission from an atomic cascade, heavy hydrogen, or calcium, for example. A 2 photon luminescence process, absorption of two quanta / two quantum luminescence processes which spin is saved, It can provide by any of two or more means including the optical parametric descent conversion (down-conversion) process which includes the both sides of the spin correlation process of Type I and Type II again, or one.

As for the light source of the pair of the quantum body in a correlation, it is desirable to offer the pair which has the randomized quantum state probability distribution. When the quantum body in the correlation of this pair is offered without the probability distribution of the randomized quantum state, one plane of polarization or spin direction of a flow of a quantum body can be rotated for the probability distribution of a quantum state, and it can randomize with various kinds of means by which this flow is combined with the flow of the quantum body which is not rotating another side. The above, Ou and Mandel1.

The means for controlling the probability distribution of the quantum state of one quantum body using the means for choosing the probability distribution of the quantum state which can observe the quantum body of another side consists of selection of quantum spin, a certain **********, Nichols prism, a wavelength plate, a Pockel cel, a two-color polarization plastic sheet, and quantum spin modification equipment [like / like a Stern-Gerlach spin analyzer]. As for the pair of the quantum body in a correlation, it is desirable to be provided as a part of flow from which the quantum body in a correlation was isolated. In the case of the photon in a correlation, this is attained by using a lens, prism, a mirror, and a polarization beam splitter and the equipment chosen from the group who consists of the combination of these equipments again with the light source which offers the photon in a correlation in order to offer being detected by the probability for any of the photon of a pair to be equal, in which flow. In the case of quantum bodies other than the photon in a correlation, this offer is attained by using optical equipment like the homogeneity magnetic field which plays a role of 'prism' to the quantum body in the electrified correlation, and the same equipment as a functional target.

The step which chooses [subject to change] probability distribution of the quantum state of the quantum body of another side for whether it ****** or not can expect that those who use this method transmit information in modulating the probability distribution of the quantum state of a quantum body, or can contain a certain whether it is and there is any end or the quantum state of the quantum body of another side is alternatively observed by order, and those any that are not observed they are. or [furthermore, / changing the probability distribution of one quantum body according to how choosing a spin selecting arrangement by observing the quantum state of the quantum body of another side with a spin selecting arrangement] -- or it can choose whether it changes or not.

This invention will be understood still more perfectly by the citation of the drawing of the following desirable example, and detailed explanation.

Easy explanation of a drawing Drawing 1 is the schematic diagram of one example of this invention.
Drawing 2 is the schematic diagram of this invention of drawing 1 changed in order to show how signal transmission can be switched.
Drawing 3 is the schematic diagram of other examples of this invention.
Drawing 4 is the schematic diagram of this invention of drawing 3 changed in order to show how signal transmission can be switched.
Drawing 5 is the schematic diagram of the example of further others of this invention which uses the light source of a different photon.
Drawing 6 is the schematic diagram of this invention of drawing 5 changed in order to show how signal transmission can be switched.
Explanation of a desirable example Here, the system and method of this invention are shown in a desirable example, and the drawing with which the same reference number was given to the same portion is referred to.
All drawings are divided into each field in order to give explanation easy. Drawing 1 and 2 emit light from the light source 10, and pass two different optical paths, and actuation of this invention is shown by pursuing the polarization condition of the photon of the pair in the correlation of Type II. As for this path, 'another side (other)', 'one side (one)', and a label are attached. In order to clarify time relation of the process in which it is acting on a photon, this path is drawn as mutually parallel. In fact, this path path is usually extended from the light source 10 to hard flow. Each of a field shows the same period in time [the photon in both paths], and initiation of a field and the location of an end show the distance of the equivalent optical path from the light source 10 over each photon. Therefore, two photons with which 'one' photon reaches the beginning of the field 2 in the path of 'another side' at the same time it reaches the beginning of the field 2 in 'one' path, and the photon of 'another side' has it in a correlation are moving the distance of the same optical path from the light source 10. This field encounters a photon in order, actuation of a field 1 is performed before actuation of a field 2, and it continues that it is the same as that of henceforth. The list of the abridged notations currently used in drawing is carried by the table 1.

'他方' (OTHER) S1 0.5 I2 0.5 X 1.0 ; '一方' (ONE) S2 0.5 I1 0.5 X 1.0	直角偏光の前調整を有し、また検出されたら、直ちに反対側の経路の中に居るように拘束される、'一方' あるいは '他方の' 経路の何れかの中で検出される等しい確率を有する信号光子とアイドラー光子を発するタイプIIの相関関係にある光子の光源。該光子は、周波数に関して縮退しており、該前調整偏光状態と相補的な直線偏光状態にある。
'他方' (OTHER) S1 0.5 I2 0.5 X 1.0 ; '一方' (ONE) S2 0.5 I1 0.5 X 1.0	平行偏光の前調整を有し、また検出されたら、直ちに反対側の経路の中に居るように拘束される、'一方' あるいは '他方の' 経路の何れかの中で検出される等しい確率を有する信号光子とアイドラー光子を発するタイプIの相関関係にある光子の光源。該光子は、周波数に関して縮退しており、該前調整偏光状態と相補的な直線偏光状態にある。
⊠	±45度の検光子
⊡	水平ー垂直検光子
(D1)	高効率光子検出器
	鏡
0.125	水平に偏光した相関関係にある一組の光子状態と該状態に関連する確率
0.125	垂直に偏光した相関関係にある一組の光子状態と該状態に関連する確率
0.25	+45度に偏光した相関関係にある一組の光子状態と該状態に関連する確率
0.0625	−45度に偏光した相関関係にある一組の光子状態と該状態に関連する確率
(/) 0.0625	括弧で囲まれた光子状態あるいはその確率は、単独の光子状態であり、相関関係にある一組の一方の光子が、観測され、残りの光子が、示された偏光状態に達していることを表す。
⟩⟩	非局在の量子相関関係事象：'他方の' 光子の偏光状態の観測は、相関関係にある '一方の' ペア光子の観測可能な偏光状態を固定する。
⟨⟨	非局在の量子相関関係事象：'一方の' 光子の偏光状態の観測は、相関関係にある '他方の' ペア光子の観測可能な偏光状態を固定する。

table 1 - Abridged notation list to drawing the light source 10 of the photon pair which is in the correlation of Type (degenerate) II with which frequency degenerated here when drawing 1 is referred to -- a photon -- ' -- on the other hand -- 'and 'another side' -- two paths are supplied. When these photons are made by the parametric descent conversion process which degenerated optically [Type II] preferably and a specific photon is observed in one path It is made for a photon to consist of the pair of the signal photon which has the probability found out in which path in the correlation of the equal same number, and an idler (idler) photon with suitable warning (caveat) that the photon used as the pair may be observed only in the path of another side after that. ****** relaxation of this warning can be carried out at the sacrifice of a signal-to-noise ratio. This type of light source supplies a signal and an idler photon in the state of the rectangular polarization relevant to the polarization condition of the pump beam of the light source. In order to give explanation simple, a signal photon is assumed to be that which polarizes perpendicularly, and an idler photon is assumed to be that which polarizes horizontally.

The one half of the light included in the path of 'another side' consists of the signal photon which polarized perpendicularly as shown in the topmost part of the field 1 of the path of 'another side', and other one half consists of the idler photon which polarized horizontally. These signal photons and idler photons are the idler photon and signal photon which go into 'one' path instead of a pair mutually with the pair, respectively. Therefore, while the sign of I1 is attached to the idler with S1 again at the signal photon in the path of 'another side', the sign of I1 is attached to S2 and an idler photon at the signal photon in 'one' path. Although S1 signal photons are I1 idler and a pair and S2 signal photons are I2 idler photon and a pair, this distinction only makes semantics only after it observes one side of the photons of a pair. Till this observation, it carries out to being detected in which path etc., and is, and all signal photon and all idler photons have probability to it.
The same polarization condition of **45 degrees of a photon as the horizontal-perpendicular (following H-V) polarization condition of a photon is a complementary quantum state according to a Heisenberg uncertainty principle. When the perfect information about one of the conditions of these exists, no information about the complementary condition also exists. The condition of **45 degrees of this photon is completely indefinite as it is shown in the pars basilaris ossis occipitalis of a field 1, since the H-V condition of the photon which emitted light from the light source 10 is known completely. Since the signal photon and the idler photon are degenerating about frequency, discernment is impossible about the polarization condition of **45 degrees, and since discernment is impossible about the probability over being detected in which path with the propagation direction again, a signal photon and an idler photon are not completely discriminable mutually. When this invention person maintains the anonymity (anonymity) of a photon for this fact, a call and this are the requirements for maintaining the non-localization quantum correlation effect which can be observed. The photon in the correlation which left the field 1 goes into a field 2 in the state of the anonymity of this homogeneity.
This invention enables signal transmission by throwing away the 'bad' photon which makes a polarization status selection, and leaving the photon which makes a 'good' polarization status selection. The step of the beginning of a these 'purification (purifying)' step is performed in a field 2 by the polarization beam splitter 12 of **45 degrees in the path of 'another side'. The photon of 'another side' included in a polarizer 12 is by carrying out to separating on the left by +45 polarization, and being detected by the detector D1, or passing as it is by -45 'potential' polarization etc., and has probability. Since the photon is not yet observed in this condition by this, it is 'potential' polarization, and the polarization condition of this last of having been observed can be made to change in the following path via additional polarization optical system.
It means that the photon detected by D1 was observed in the state of +45 polarization.
If the Copenhargen interpretation of quantum mechanics is followed, observation of this photon will contract the wave function of the photon of the pair in a correlation, and will make the remaining photon in 'one' path effectively the polarization which intersects perpendicularly with the detected photon momentarily. Contraction of the wave motion function by observation of the photon in the path of 'another side' makes the correlation event which attached the sign of A into drawing 1 and was shown in mark by >>>. one [which has a pair photon / 'one'] photon of 'another side' detected by D1 in a correlation -45 polarization -- ** -- it becomes. 'One' photon, such as this, is a photon independent now, and are not some photons of the pair in a correlation, and this condition is symbolized in the parenthesis surrounding the polarization direction sign and a probability value.
One [which is a part of pair which is still in a correlation / 'one'] photon is still the indefinite condition of **45 degrees. After the photon of the remaining 'another side' passes a beam splitter 12, it is
- A field 2 is left by 45 polarization.
In a field 3, 'one' photon diverts all independent photons and goes into the polarization beam splitter 14 which makes the remaining pair photon face to a detector D2. Since 'one' independent photon and photon of 'another side' of a pair are already detected by the detector D1 of a field 2, detection of the independent photon by D2 does not bring any effects to the photon in the path of 'another side'. Since it is detected by D2 and 'one' photon of a pair is observed as what is in the condition of -45 degrees, the group of this photon in the path of 'another side' serves as an independent photon, and can give a

correlation to the condition of +45 degrees. This is shown by the sign B which shows a correlation. one [which passes a polarizer 14 / 'one'] photon is potential -- the polarization condition of +45 degrees is attained.
The photon of 'another side' consists of equal mixing of the pair photon which has -45 polarization +45 degrees as potentially as the independent photon of a polarization condition here. Shortly after going into a field 4, the photon of 'another side', such as this, is deflected for an independent photon by the detector D3, and it is potential. - The polarization beam splitter of **45 degrees which a pair photon passes is encountered maintaining the polarization condition of 45 degrees. The photon of this the remaining 'another side' is a pair to 'one' remaining photon. Drawing 1 shows that 75% of the pair of a photon of the photon with a certain ****** 'bad' on the other hand inputted into each to the path of 'one' path and 'another side' since it chose was thrown away at this time. [a polarization condition] The 25 remaining% of the inputted photon chooses a 'good' polarization condition, and it is useful to signal transmission. This etc. is the photon passed to fields 4-5.
a field -- five -- arriving -- a pair -- ' -- one side -- ' -- a photon -- a horizontal - a perpendicular (H-V) -- a polarizer -- 18 -- close -- being equal -- probability -- right-hand side -- deviating -- having had -- a horizontal -- (-- H --) -- a photon -- caudad -- going -- passing -- a perpendicular -- (-- V --) -- a photon -- dissociating -- having . Drawing 1 is shown that H photon is reflected from a mirror 23 in order to keep compact, and this photon does not change a polarization condition. The photon of 'another side' which arrives at a field 5 is equally divided into V photon which turns caudad again with H photon which is the same method and was deflected by the left, and is passed after going into the H-V polarizer 20, and H photon is reflected by the mirror 22 by the same reason as 'one' photon was reflected by the mirror 23. The both sides of the photon of 'one side' and 'another side' leave a field 5 in the settled H-V condition and the indefinite condition of **45 degrees.
the photon of 'another side' of H-V which arrives at a field 6 -- polarization beam splitters 26 and 24 -- respectively -- close -- since -- it is detected in the state of **45 polarization decided by detector D4a, D4b, and D5a and D5b. Detector D4a and D4b observe the photon of + 'another side' which attained the polarization condition of 45 degrees, and detector D5a and D5b observe the photon of - 'another side' which attained the polarization condition of 45 degrees. Observation of the photon of 'another side' constitutes the correlation event which sets up the polarization condition of **45 degrees of the pair in 'one' path. This is shown by the sign C showing a correlation. The one half of 'one' photon attains +45 potential polarization, and the remaining one half attains -45 potential polarization. Now, 'one' photon, such as this, is an independent photon which lost the photon of the pair of 'another side' as shown by the parenthesis surrounding a polarization vector. 'One' independent photon which leaves a field 6 goes into polarizers 28 and 30 in a field 7, and is observed in the state of **45 polarization decided by detector D6a, D6b, and D7a and D7b. Detector D6a and D6b observe + one [which has the polarization condition of 45 degrees / 'one'] photon, and detector D7a and D7b observe - one [which has the polarization condition of 45 degrees / 'one'] photon.
The probability distribution of the photon detected in the fields 6 and 7 shown as a rate of the photon of the condition of +45 degrees supplied by the light source 10 into [each] the field of 'one side' and 'another side' and the whole observed as a rate in the condition of -45 degrees again is important.
The probability distributions of the photon of 'another side' are (0.125, 0.125). the probability distribution of 'one' photon -- moreover (0.125 0.125) -- it is . This distribution is the result of being observed with the H-V polarizer 20. It can be considered that 'one' probability distribution, such as this, is the 1st condition of the binary (binary) condition transmitting method. The 2nd condition is shown in drawing 2 .
The H-V polarizer 20 of arrangement of the optical system of drawing 2 is the same as that of this arrangement of drawing 1 except for the point removed from the path of 'another side'. The optical process and polarization condition of fields 1, 2, 3, and 4 of drawing 2 are the same as what is shown in the same field of drawing 1 .
The photon of 'another side' included in a field 5 passes through this field without being changed, and it maintains this potential -45-degree condition set up in the field 2. Since the photon of any 'another side'

is not deflected towards a mirror 22, the photon of any 'another side' does not go into the polarizer 26 of **45 degrees, and any photons are not observed by detector D4a and D5a in a field 6. After the photon of 'another side' which arrives at a field 6 goes into the polarizer 24 of **45 degrees, it is passed as it is to detector D5b. Since the photon of any 'another side' included in a field 6 does not have the potential polarization condition of +45 degrees, these any photons are not deflected towards detector D4b with a polarizer 24 by it. The probability distribution of the photon of observed 'another side' defined above changes to (0.0, 0.25), when the H-V polarizer 20 is removed.
one [included in a field 5 / 'one'] photon is processed by the same method as drawing 1 -- having -- this photon -- the hH-V polarizer 18 -- close -- since -- it was equally divided into the condition of H and V, and was made from this division in the field 3 -- this -- potential -- the condition of +45 degrees is lost. -45 observation of the photon of 'another side' of a condition by detector D5b in a field 6 sets the potential polarization condition of 'one' photon as the condition of +45 degrees according to the correlation effect of the non-localization quantum shown with Sign C.
After one [which arrives at a field 7 / 'one'] photon goes into the polarizers 28 and 30 of **45 degrees, it is detected by detector D6a and D6b. Since one [any / 'one'] photon of a condition does not exist potential -45 degrees, any photons do not pass polarizers 28 and 30 for detection by detector D7a and D7b. The probability distribution by which 'one' photon defined above was observed changes to following (0. 25 0.0). This change of the quantum state probability distribution of one ['another side' and / 'one'] photon constitutes a signal transmitting event.
Between arrangement of drawing 1 and drawing 2 , it is important to care about that any change is not made to the light source 10, and any change is made to no optical elements in 'one' path. this -- the only modification made between two arrangement -- 'another side' -- it is insertion or exclusion of the H-V polarizer 20 in a path. although one [** 'another side' and / 'one'] path can be detached distantly physically -- the inside of the path of 'another side' -- this -- modification of optical arrangement changes the probability distribution of the photon with which it was observed in 'one' path.
Many features of this invention can be changed unless the capacity to affect it is substantially changed into the probability distribution by which 'one' photon was observed by operating the probability distribution by which the photon of 'another side' was observed by inserting or eliminating a polarizer 20. The polarizer is made of the beam splitter of various kinds of thin films as shown all over these drawings. this polarizer -- however, Wollaston prism (Karl Lambrecht part number MW2A-10-5), a ****-ized magnesium Rochon prism polarizer (Karl Lambrecht part number MFRW2A-10-5), the pile polarizer of the conventional 'board, or 2 color plastics polarization sheet polarizer (other things of various kinds of like the International Polarizert part number LP 38 are possible.)
It is surrounded by the core box of the dashed line with which the sign was attached for two or more optical elements as a 'option' in drawing 1 and the both sides of 2. When this element is removed, the water Hiramitsu child deflected with the polarizer 18 is discarded, and 'one' probability distribution of one [which was observed since it did not go on towards the polarizer of a field 7 / 'one'] differs from drawing 1 and 2. Removal of this element does not remove 'one' existence of a polarizer 20 or dependency which receives absent of 'another side' of probability distribution. Removal of this element changes the probability distribution of the independent photon and the photon of 'another side' observed since a photon was not observed by detector D4b and D5b of 'another side' of a pair of 'another side'. 'Purification' of the independent photon of 'another side' is carried out from the path of 'another side' by this element arranged as shown in drawing 1 and 2, and detector D4b and D5b detect only the photon of the pair of 'another side' by it. When an optical element is removed from drawing 1 , the probability of one ['another side' and / 'one'] path is (0.0625, 0.0625), respectively (0.125 0.125). When the element of an option is removed from drawing 2 , the probability over one ['another side' and / 'one'] path is (0.125, 0.0), respectively (0. 25 0.25).
It can replace with this board that randomizes the polarization probability distribution of the H-V polarizers 18 and 20 and the photon which passes a quarter wavelength plate for the function of mirrors 22 and 23 again and that was arranged appropriately. By this exchange, equipment can be simplified by removing detector D4a, D5a, and D6a and D7a with polarizers 18, 20, 26, and 30 and mirrors 22 and 23

again. Furthermore, it can also remove from equipment without changing the dependency of this distribution of as opposed to 'one' existence of a polarization randomization element (the polarizer 20 or quarter wavelength plate of this location) and absence of the probability distribution of a photon and 'another side' of a field 5 for a polarizer 16 and a detector D3. The simplified this equipment is indicated to be drawing 3 in 4.

Drawing 3 shows the example by which this invention with which most optical elements are removed and the H-V polarizers 18 and 20 are replaced with the quarter wavelength plates 32 and 34, respectively was simplified. The function of quarter wavelength plates 32 and 34 is the same as the function of the H-V polarizers 18 and 20, and both optical equipments randomize the polarization condition of **45 degrees which can observe the photon passed via this equipment.

The optical process and polarization condition of fields 1, 2, 3, and 4 of drawing 3 are the same as what is shown in drawing 1 and the field of 2. 'One' photon which left the field 4 goes into a field 5 via the quarter wavelength plate 32 adjusted so that this photon may convert this linearly polarized light condition into an annular polarization condition. The probability for the light which polarized annularly to pass the linearly polarized light child of what kind of direction is also 50%, and, as for the light which polarizes annularly, does not have any potential linearly polarized light conditions. The photon of 'another side' which leaves a field 4 passes the quarter wavelength plate 34 in a field 5, and becomes annular polarization.

In a field 6, after the photon of 'another side' which polarized annularly goes into the polarizer 24 of **45 degrees, it is deflected towards detector D4b and D5b by equal probability. Observation of the photon of a pair sets one [corresponding to this photon / 'one'] ** 'another side' photon as the perpendicular polarization condition of **45 degrees by equal probability, and constitutes a correlation event. 'One' photon goes into a field 7, and this photon is the polarizer 28 of **45 degrees there, and it is deflected towards detector D6a and D7a.

The probability distributions by which the photon of 'another side' of the pair in polarizer D4b and D5b is observed are (0.125, 0.125). the probability distribution of polarizer D6 one [in b and D7 / 'one'] photon -- again (0.125 0.125) -- it is .

Fields 1-4 and the portion of the equipment containing the quarter wavelength plate of 'one' path in a field 5 are surrounded and shown by the core box of drawing 3 and the dashed line in 4. the photon in the correlation which is in the prepared quantum probability condition about the photon in the correlation in the condition that all the elements in this core box were prepared -- the remainder -- ' -- on the other hand -- 'and 'another side' -- it can be regarded as what constitutes the source 36 of the photon which gave the correlation to the condition of having been prepared with which an optical element is provided. The equipment of 'one' equipment, polarizer 28 and detector D6a, remaining D7a, and the remaining, remaining 'another side', It is contingent [on the optical path length from the light source to 'one' polarizer 28 being larger than the optical path length from the light source 10 to detector D4b and D5b of 'another side' in a quarter wavelength plate 34, a polarizer 24 and detector D4b, and D5b]. It can put also on distance with what kind of sufficient convenience from the photon light source 36 in a correlation.

The quarter wavelength plate 34 of 'another side' of drawing 4 is the same as that of drawing 3 except for being removed. This result is released into a field 5 by -45 potential polarization to which this photon attained the photon of 'another side' of a pair in the field 2. When the photon of 'another side' of this pair is observed by detector D4b and D5b in a field 6, this photon has a correlation and changes 'one' pair photon into the polarization condition of +45 degrees. The observed probability over one ['another side' and / 'one'] photon is changed into (0.0, 0.25), and (0.25, 0.0), respectively, and modification of this probability constitutes a signal transmitting event.

Drawing 5 and 6 show use of methods, such as this by the photon light source 38 in the parallel polarization correlation of Type I, and a correlation. In drawing 5 , the polariscope 14 of one exception, i.e., 'one' path of **45 degrees, of arrangement of an optical element is the same as that of this arrangement of drawing 3 except for rotating to the ** sake which makes a detector D2 turn and deflect the photon of +45 degrees which polarized, and makes the next field of equipment pass the photon of -

45 degrees which polarized. This is opposite to the function of the polarizer 14 in drawing 3 . It differs in that the property of the light source 38 asks for having a correlation to an parallel polarization condition like [in the aforementioned drawing] in a photon instead of a perpendicular polarization condition, as for an operation of this element on the photon which has it in a correlation while this is modification of only an optical element.
The optical element which can attach the reference mark of 40 and is surrounded by the core box of a big dashed line in drawing 5 and 6 ** constitutes another gestalt of the photon light source driven according to the photon light source 38 in the correlation of Type I, when [this] it is in the correlation in the condition of having been prepared.
Thus, the potential polarization condition of 'one' photon of 'another side' of +45 degrees that communication of a non-localization quantum correlation corresponds when a photon is detected by the detector D1 is set as the same polarization condition of +45 degrees. This is 'one' independent photon of one [which was extracted from the path with the polarizer 14 / 'one']. The probability distribution by which one ['another side' and / 'one'] photon was observed is the same as the probability (0.125 0.125) in drawing 3 [as opposed to 'another side' and 'one side' to drawing 5].
Drawing 6 shows the signal send state to the type I light source equivalent to the type II light source of drawing 4 . A polarizer 14 is in the same location as the inside of drawing 5 , and this polarizer plays the same role as the inside of this drawing. The passage in drawing 4 , 'one' photon of 'another side' which corresponds by the quarter wavelength plate 34 being removed can be set as -45 degrees, and the condition of the photon of 'another side' of -45 degrees can be handed over now to detector D5b. The observed probability distribution is the same (0. 0 0.25) to the path of the both sides in this drawing here. It should care about that the probability distribution in each path of drawing 4 is mutually [similarly and] opposite.
the method in many drawings of all -- moreover, the thing for which it cares about that it is important for no a certain ** derivative methods, specific angles of a polarizer, and potential polarization conditions of the photon produced as a result in itself similarly -- ** -- it is important. It is the relation between each polarizer and the polarization condition of the photon known that it is importance. Therefore, when equipment is rotated -45 degrees, the signal from the light source 10 and the H-V output polarization condition of an idler will be in the polarization condition of **45 degrees known, and a H-V polarizer turns into a polarizer of 45 [**], and the polarizer of **45 degrees turns into a H-V polarizer.
It was related by 6 from drawing 1 , and this invention person showed especially the desirable example of this invention which uses a photon. As an alternative plan, this invention is applicable to the quantum body in various kinds of correlations containing Bose particles, a fermion, and an atom. Any sources of a quantum body are applicable to this invention, as long as the quantum body in a correlation is made.
Furthermore, the control means currently explained above especially a beam splitter, or the means indicated as a quarter wavelength plate can be replaced with what kind of suitable spin selecting arrangement which can be used in order to choose the probability distribution of the quantum state of the quantum body which should be observed for which it wishes. A suitable spin selecting arrangement contains not only a polarization beam splitter but a Nicol prism (Nichols prism), a wavelength plate, a Kerr cell (Kerr cell), a pockels cell (Pockel cell), polarization sheet-plastic material, and Stern-Gerlach spin analysis equipment. The suitable type of the detection equipment for performing detection of the quantum state of the one or the both sides of the quantum body of a pair or observation contains a micro channel plate scintillation detector and a Faraday cup.
It is in ** that it can change into this invention or can convert without this contractor's deviating from the intention and range of this invention which are set up in this application, since this invention was explained in detail here.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

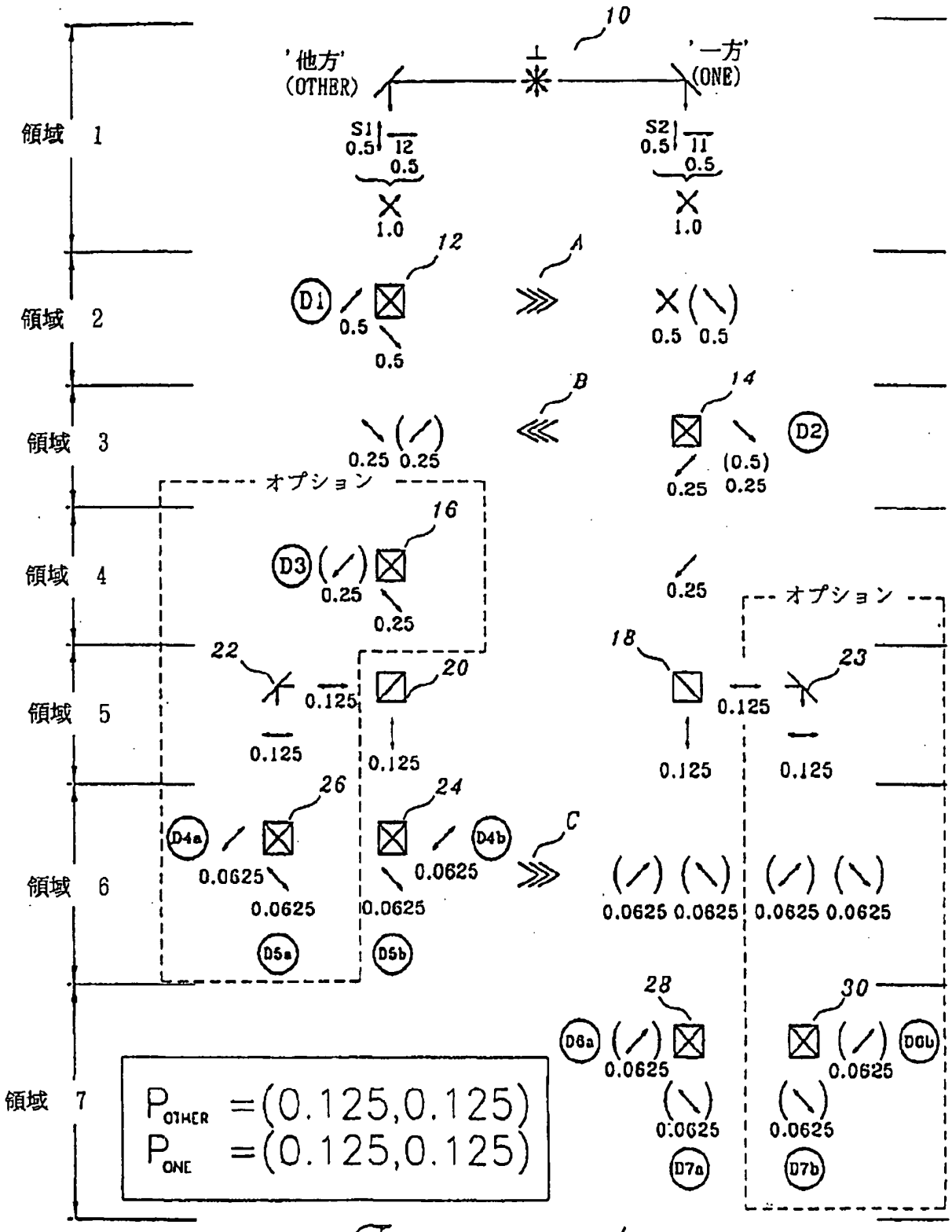

Figure 1

[Drawing 2]

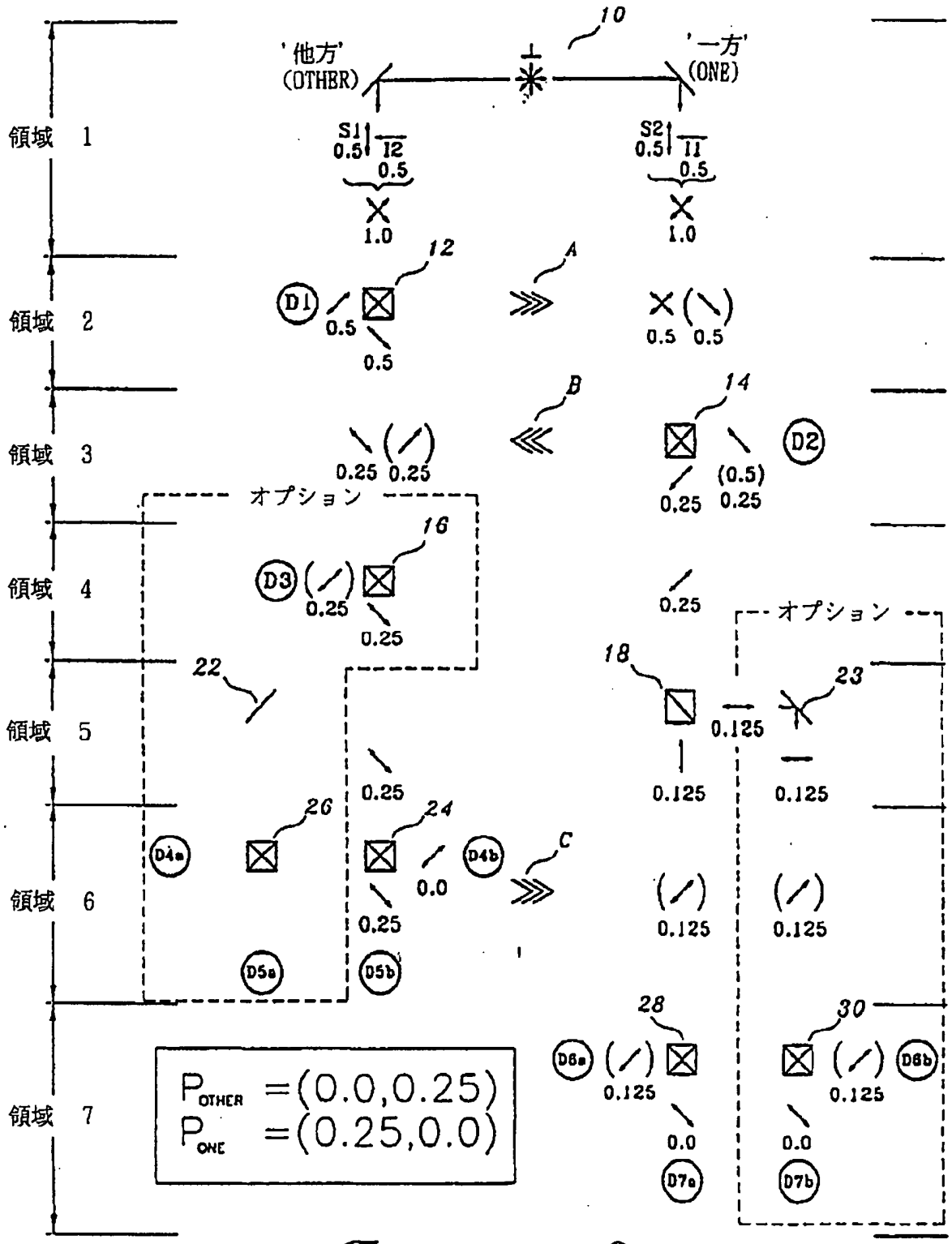

Figure 2

[Drawing 3]

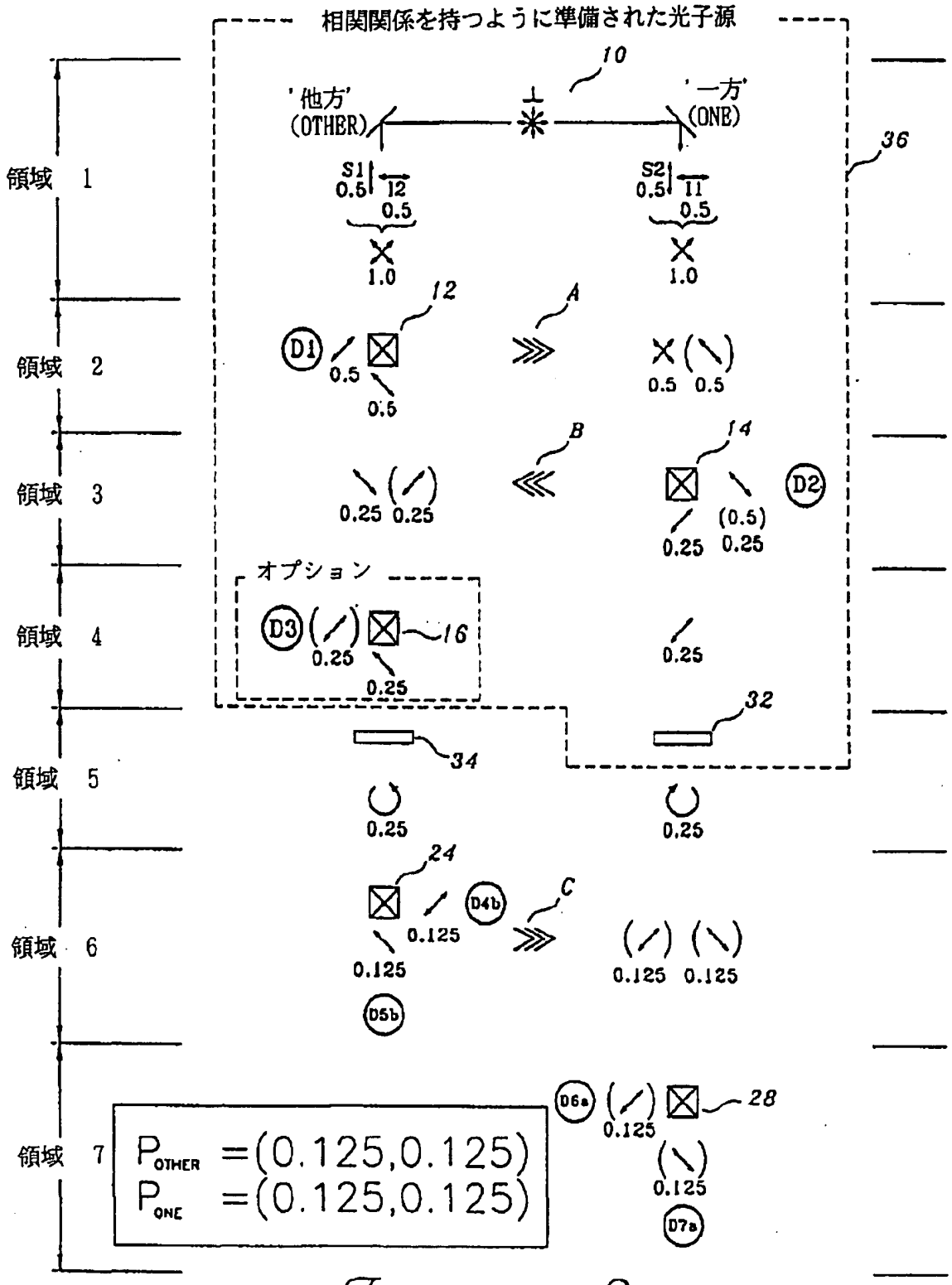

Figure 3

[Drawing 4]

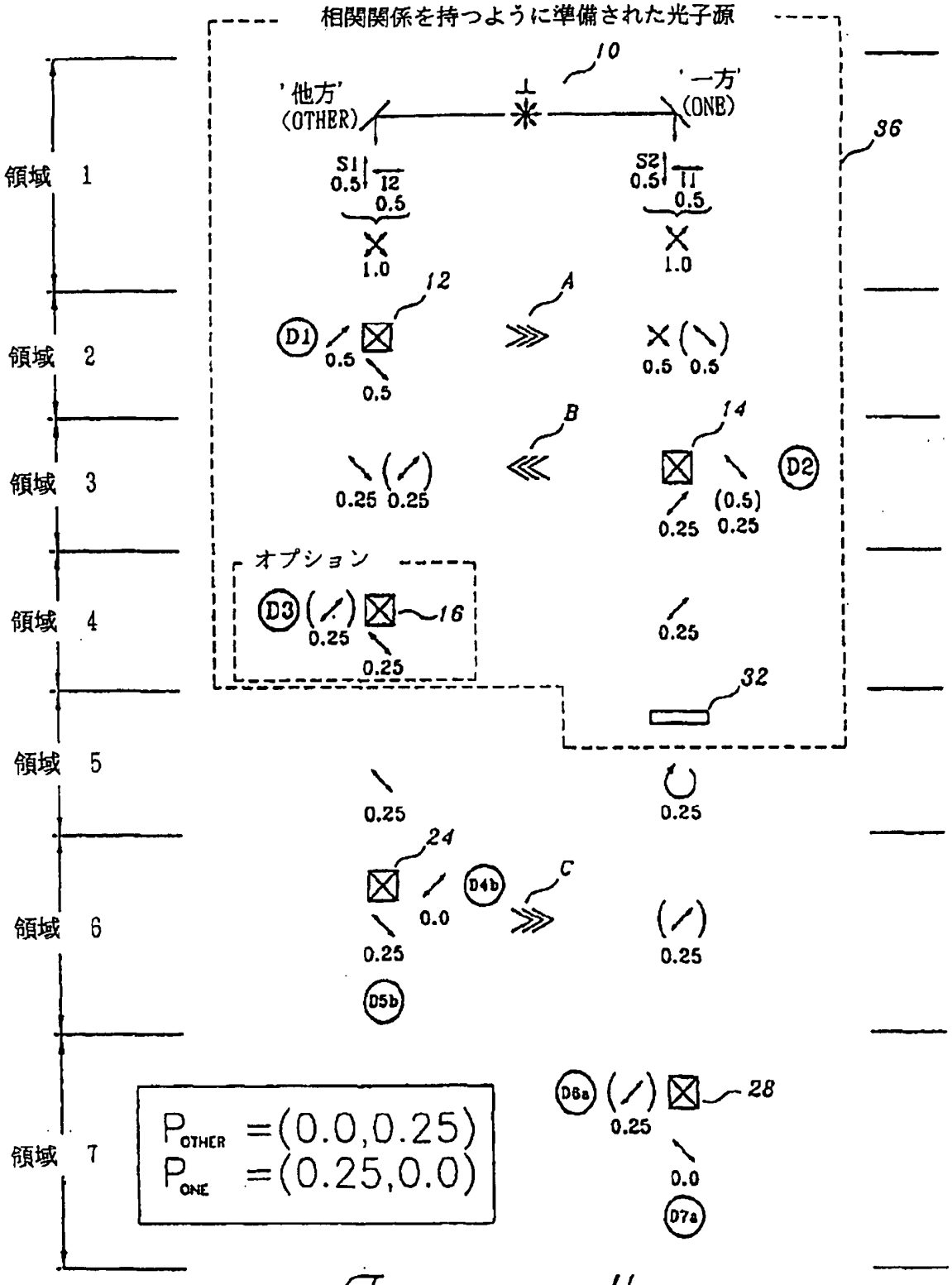

Figure 4

[Drawing 5]

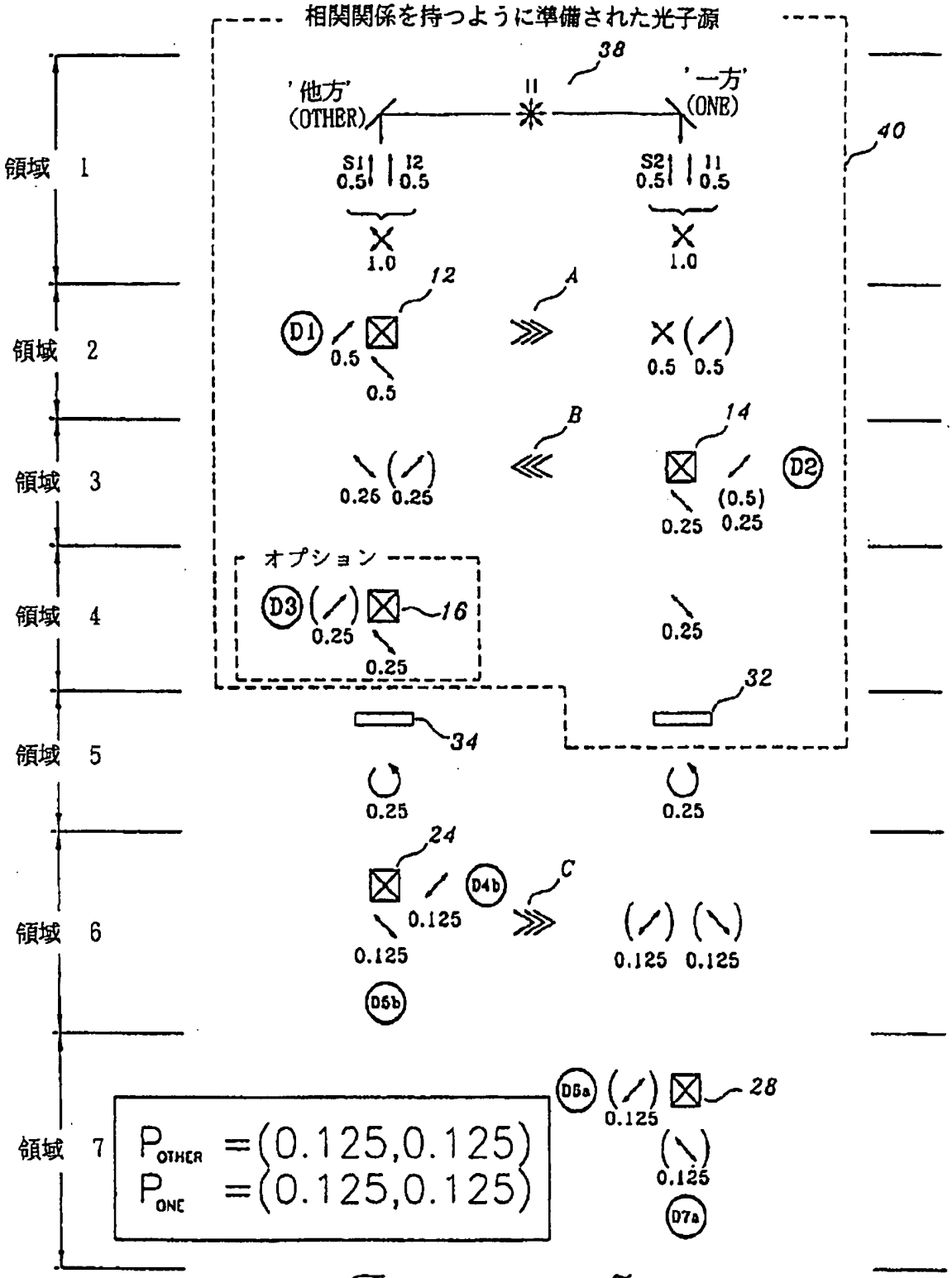

Figure 5

[Drawing 6]

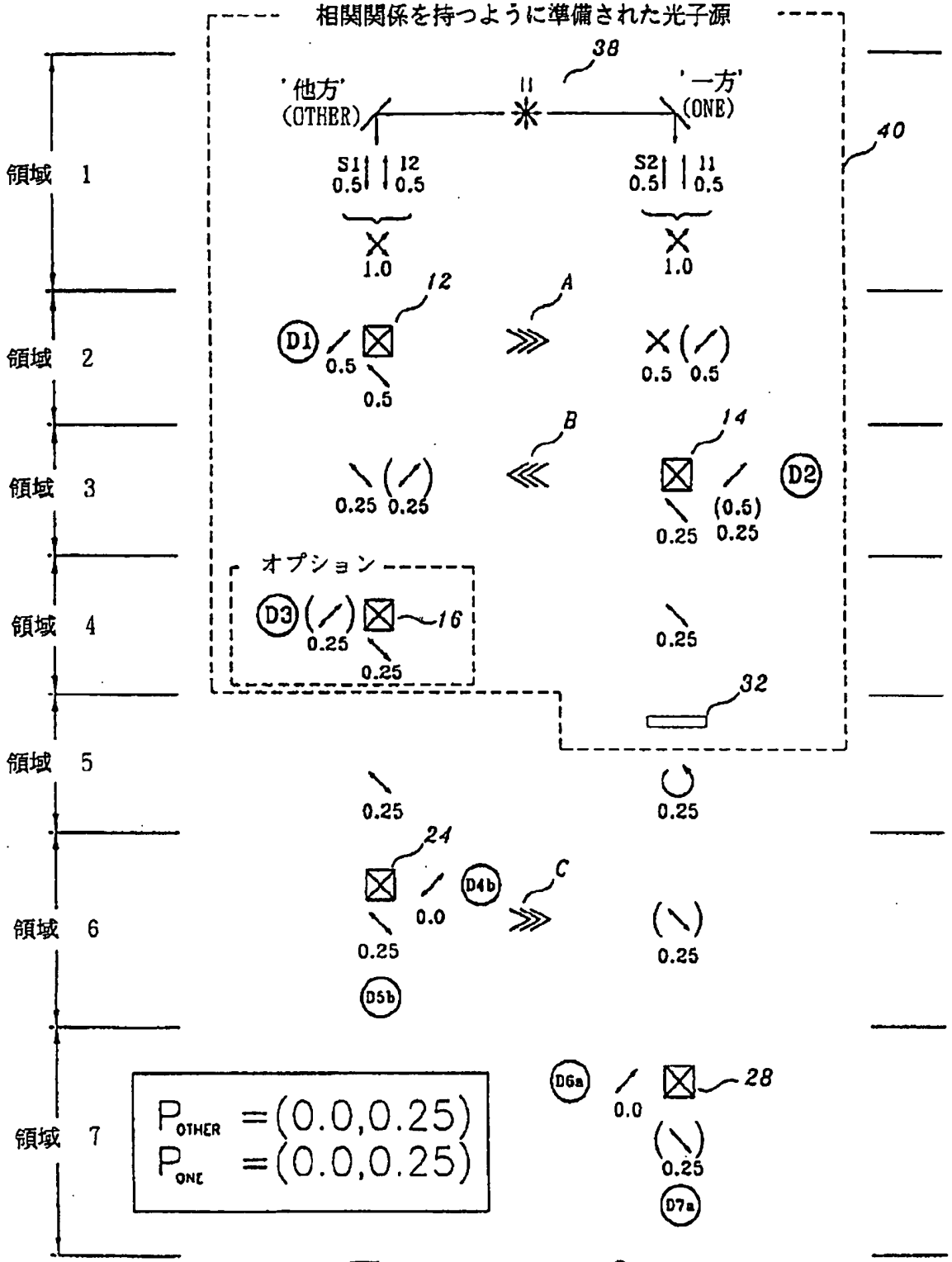

Figure 6

[Translation done.]